

# PATENT SPECIFICATION (11)

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- (21) Application No. 27583/74 (22) Filed 21 June 1974 (19)  
 (31) Convention Application No. 2 331 861  
 (32) Filed 22 June 1973 in  
 (33) Germany (DT)  
 (44) Complete Specification published 18 Feb. 1976  
 (51) INT. CL.<sup>3</sup> B65B 53/06  
 (52) Index at acceptance  
 B8C 10F1 10F3 X6



## (54) HEAT-SHRINKING APPARATUS

(71) We, FR. HESSER MASCHINEN-FABRIK AKTIENGESELLSCHAFT, a German Company, of 99 Nauheimer Strasse, Stuttgart-Bad Cannstatt, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The invention relates to an apparatus for shrinking heat-shrinkable wrappings onto articles.

A heat-shrinking apparatus, already previously proposed in German Utility Model 1876453, comprises a conveyor of a fine or coarse mesh type, which transports articles wrapped in heat-shrinkable film over nozzles from which steam is discharged. A disadvantage of this apparatus is that the conveyor prevents the heat transfer medium from reaching the whole of the bottom surface of the wrap and thus hinders the shrinkage of the latter.

25 A heat shrinking apparatus, already proposed in German Auslegeschrift 1237943, comprises two parallel laterally offset pairs of chains, which are driven by means of sprocket wheels arranged on a common axle, so that uninterrupted transfer is provided from a first conveyor to a second conveyor. The shrinking apparatus also incorporates a device for supplying hot air, provided with nozzles in the regions of both the first and the second conveyors. 35 By means of this arrangement of chains and nozzles it is possible to subject the bottom surfaces of wrappings, incompletely shrunk during their travel over the first conveyor, to further treatment during their travel over the second conveyor. The after-treated regions of the bottom surfaces are easily recognisable, however, and, if the articles are heavy, full advantage cannot be taken of the shrinkability of the film.

45 According to the present invention, there is provided an apparatus for shrinking heat-shrinkable wrappings onto articles, having a conveyor system comprising a first conveyor section and a second conveyor sec-

tion sequentially aligned with the first conveyor section and spaced from the first conveyor section by a clearance the apparatus also having at least one nozzle arranged in said clearance for directing heat transfer medium onto the wrappings.

55 Preferably, the or each nozzle is a slit-orifice nozzle extending transversely of the direction of conveying of the conveyor system. The arrangement of at least one slit-orifice nozzle in the clearance extending transversely to the direction of conveyance enables heated air or other gas to be blown continuously and without obstruction on to the bottom surfaces of the wrappings, at close range and across the entire width thereof. Substantially improved heat transfer is thereby achieved, which enables very rapid heating, so that the particular region of the wrapping is fully shrunk before it comes into contact with the second conveyor section. Since there is no obstacle to heating and shrinkage, the wrappings shrink smoothly and evenly, and it is possible to make full use of the capacity for shrinkage of the film employed. The substantially improved heat transfer enables the construction of the apparatus to be substantially shorter than that of hitherto known heat-shrinking apparatus and also enables heat losses to be reduced.

80 In a preferred embodiment, the or each nozzle is inclined to the direction of conveying of the conveyor system. Having one slit-orifice nozzle inclined in a direction opposite to the direction of conveyance, and one slit-orifice nozzle inclined in the same direction as the direction of conveyance ensures that the front and rear end surfaces of the film in which the articles are wrapped are also heated and shrunk more quickly than hitherto.

85 The invention is further described, by way of example with reference to the accompanying drawing which is a side elevation of a heat-shrinking apparatus in accordance with the invention.

95 The heat-shrinking apparatus has a conveyor system 1, nozzles 2, 3 and 4, air

heaters 5 and 6, and a blower 7. The conveyor system 1 comprises a first endless conveyor belt 8 forming a first conveyor section 28, and a second endless conveyor belt 9 forming a second conveyor section 29 which is aligned with the first conveyor section 28 and spaced therefrom so that a clearance 10 is provided between the two conveyor sections. The belts 8 and 9 are guided by rollers 11 and 12 and are supported on tables 13 and 14. The first conveyor belt 8 serves to transport articles 16, enclosed in wrappings 15 of heat-shrinkable film, across the clearance 10 to the second conveyor belt 9. The articles 16 shown are dishes containing foodstuffs 17.

Two nozzles 2 and 3 are provided in the clearance 10 and are adjustable with respect to the level of the upper runs 8a and 9a of the conveyor belts 8 and 9. One or more than two such nozzles may be provided.

The nozzles 2 and 3 are preferably slit-orifice nozzles for producing uniform flat jets 2a and 3a. Air, heated by means of the air heater 5, is supplied to the nozzles 2 and 3 by means of the blower 7.

A single slit-orifice nozzle may be arranged vertically in the clearance 10, in a manner not shown, and would be sufficient for shrinking the bottom surface of the wrappings 15, preferably however, and as shown in the drawing, one slit orifice nozzle 2 is inclined in a direction opposed to the direction of conveyance and the other nozzle 3 is inclined in the direction of conveyance. This angular arrangement of the nozzles 2 and 3 enables sufficient heating and shrinkage of the front and rear ends of the wrappings 15 to be achieved even in the case of tall articles 16. This arrangement is also advantageous if seams 18, positioned half way up the height of the wrappings 15, are required to be drawn underneath rims 19 of the articles 16.

The nozzle 4, which is connected to the air heater 6 and is supplied with air by the blower 7, is arranged preferably above the second conveyor band 9, preferably downstream of the clearance 10. This positioning of the nozzle 4 results in heat-shrinkage of the top of the wrapping 15 only after the seam 18 has been drawn below the rim 19. Instead of the single nozzle 4, a plurality of upper nozzles (not shown), extending at an angle similarly to the nozzles 2 and 3, may be provided.

The table 13 supporting the first conveyor belt 8 may be provided with heating means 20, for the purpose of enabling the bottom surfaces of the wrappings 15 to be pre-heated to a temperature below the shrinkage temperature before they reach the clearance 10. Heating by means of the nozzles 2 and 3 up to the shrinkage temperature is then accomplished more quickly, and the output of the apparatus is thereby increased. Instead of the heated table 13, nozzles (not shown) might alternatively be used for pre-heating.

#### WHAT WE CLAIM IS:—

1. An apparatus for shrinking heat-shrinkable wrappings onto articles, having a conveyor system comprising a first conveyor section and a second conveyor section sequentially aligned with the first conveyor section and spaced from the first conveyor section by a clearance, the apparatus also having at least one nozzle arranged in said clearance for directing heat transfer medium onto the wrappings.

2. An apparatus as claimed in claim 1, in which the or each nozzle is a slit orifice nozzle.

3. An apparatus as claimed in claim 1 or claim 2, in which the or each nozzle is inclined with respect to the direction of conveying of the conveyor system.

4. An apparatus as claimed in any of claims 1 to 3, in which at least one additional nozzle is arranged above the conveyor system downstream of said clearance.

5. An apparatus as claimed in claim 4, in which the or each additional nozzle is inclined with respect to the direction of conveying of the conveyor system.

6. An apparatus as claimed in any of claims 1 to 5, in which heating means adapted to preheat the wrappings to a temperature below the temperature of shrinkage are located upstream of said clearance.

7. An apparatus for shrinking heat-shrinkable wrappings onto articles, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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## COMPLETE SPECIFICATION

This drawing is a reproduction of  
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